

Home Office Ergonomics

When Working from Home is a Real Pain

Mitchell A. Garber
MD, MPH, MSME

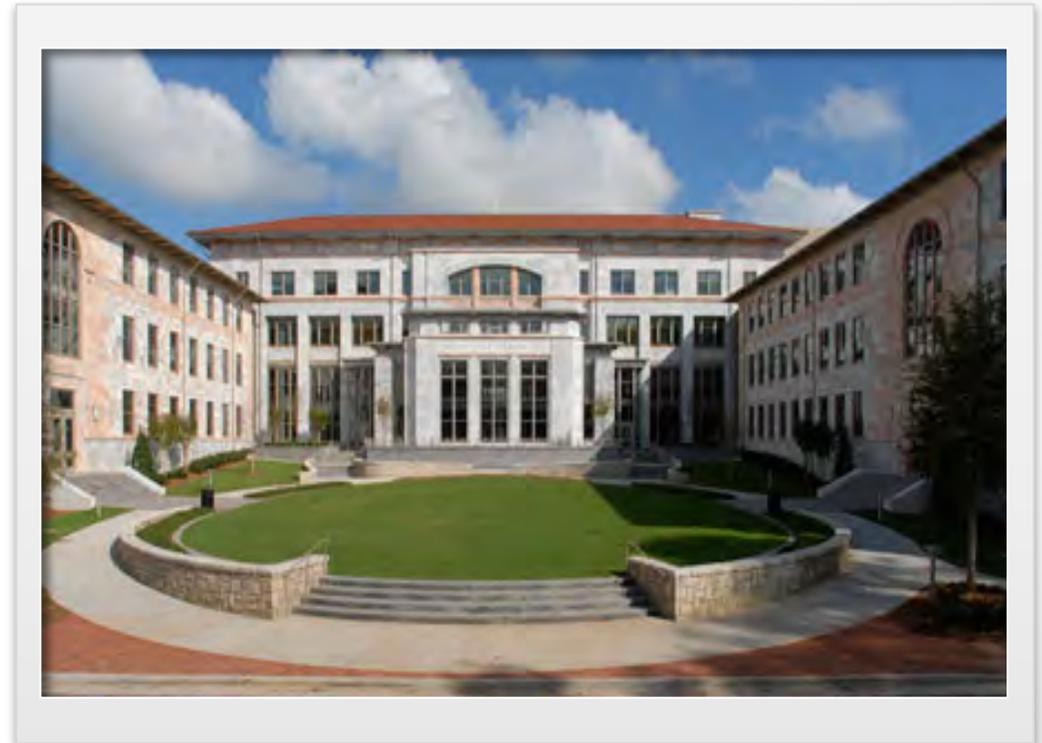
Agenda

- Me
- Background
- Common Problems
- Recommendations
- Discussion



Education

- B.A. Duke University
Psychology/Sociology
- M.D. Emory University
- M.P.H. Harvard University
Occupational/Environmental
- M.S.M.E. Georgia Tech
Bioengineering



Employment



- USAF Flight Surgeon
- NTSB Medical Officer
(first person in position)
- ESi Senior Managing Consultant

Certification

Board Certification in Aerospace Medicine

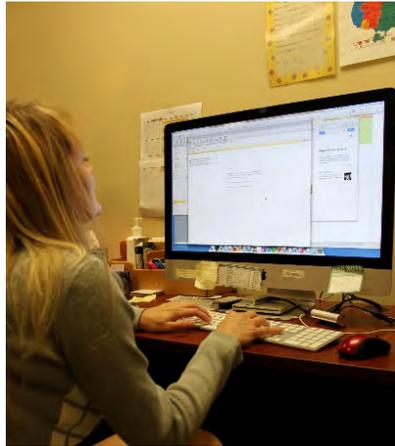
Experience

- Over 1,500 Investigations
- Congressional Testimony
- Initiated Office Ergonomics Programs

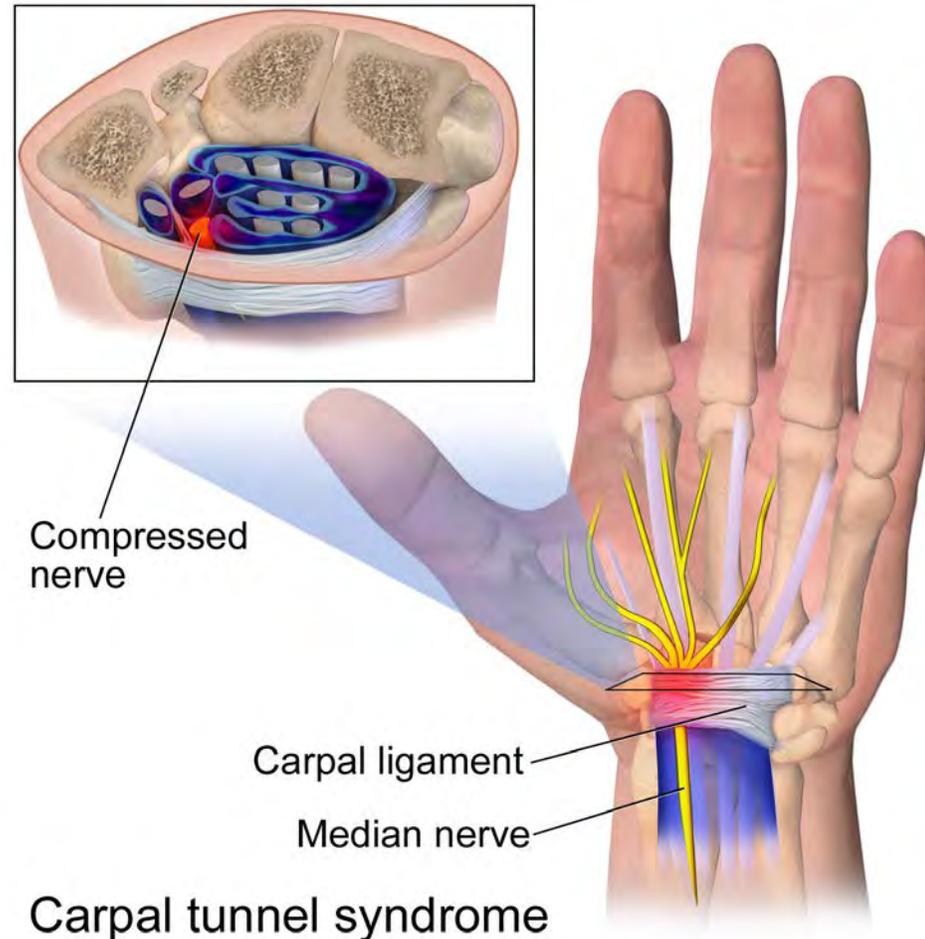


What is Office Ergonomics?

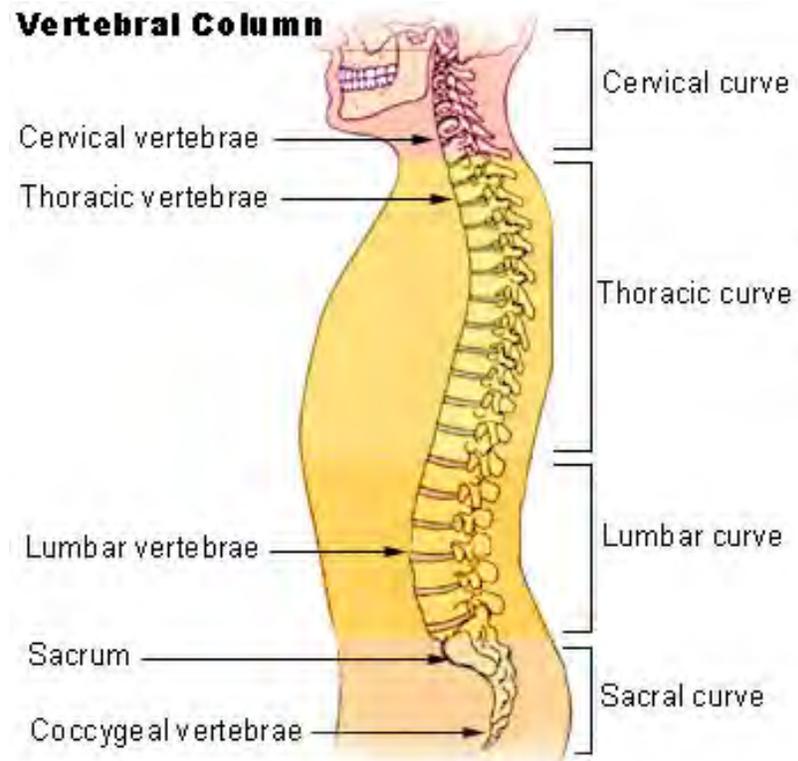
Application of engineering principles to the interaction of humans and their office workspaces.



Carpal Tunnel

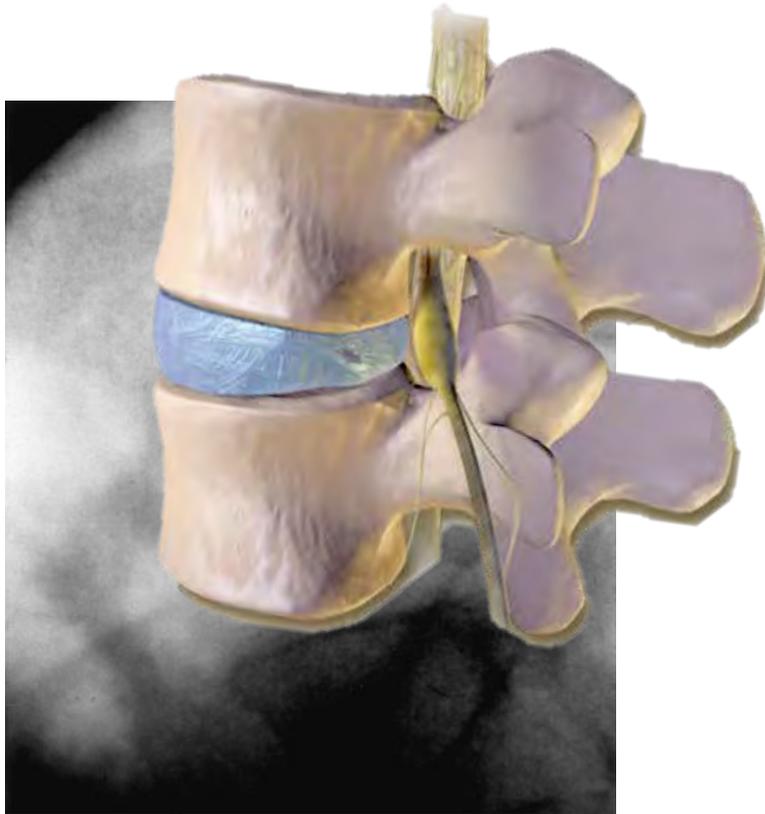


Spinal Anatomy

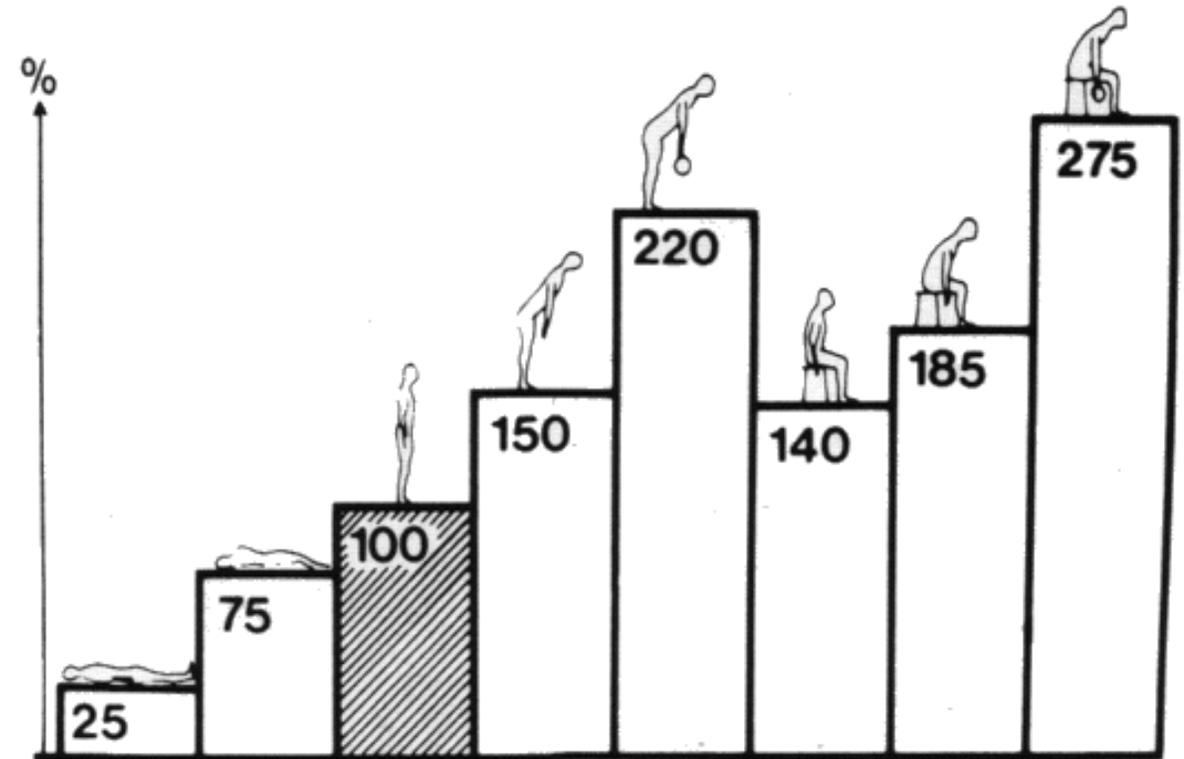


Blausen.com staff. "[Blausen gallery 2014](#)". *Wikipedia Journal of Medicine*. DOI:[10.15347/wjm/2014.010](#). ISSN [20018762](#).

Intervertebral Disc Pressure



Blausen.com staff. "[Blausen gallery 2014](#)".
Wikiversity Journal of Medicine.

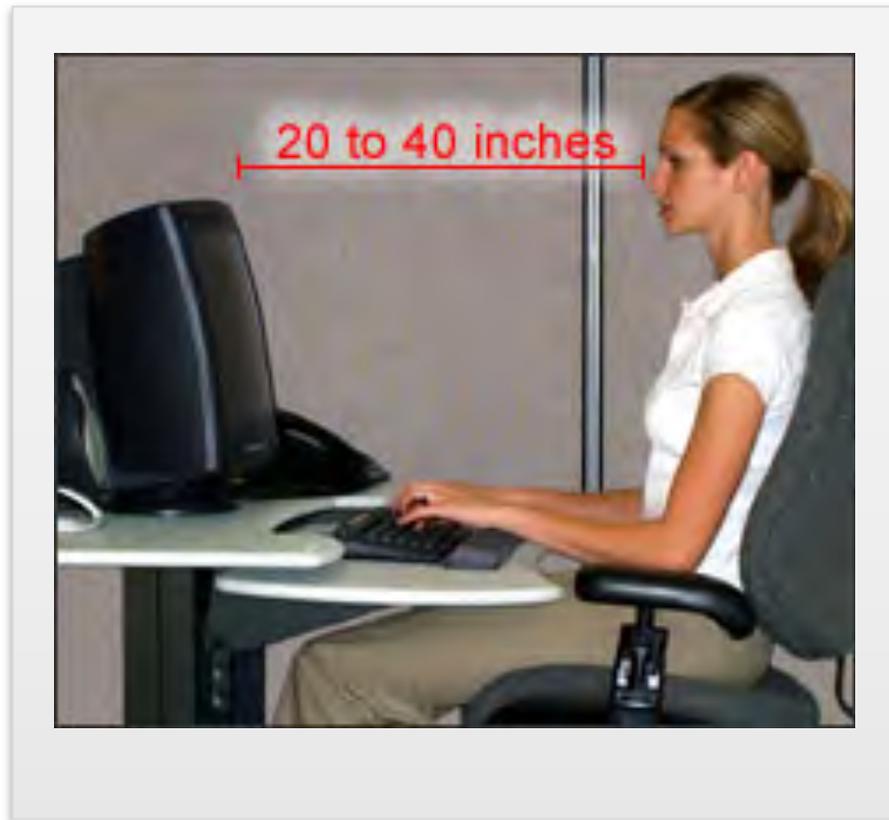


In vivo (live person) loads on L3-4 disc. Standing=100

Nachemson, A. L.: The lumbar spine, an orthopaedic challenge. Spine 1:59, 1976

Monitor Distance - Existing Guidance - Not Accurate!

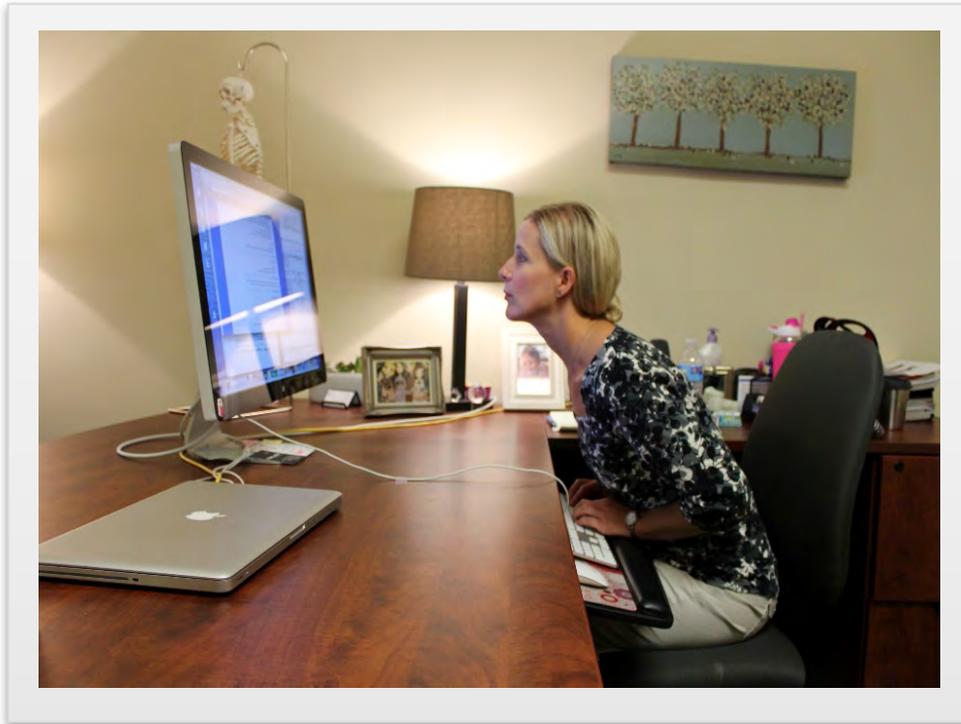
J. Human Ergol., 11: 45-53, 1982



PREFERRED VDT WORKSTATION SETTINGS, BODY POSTURE AND PHYSICAL IMPAIRMENTS



Monitor Distance - Existing Guidance - Not Accurate!



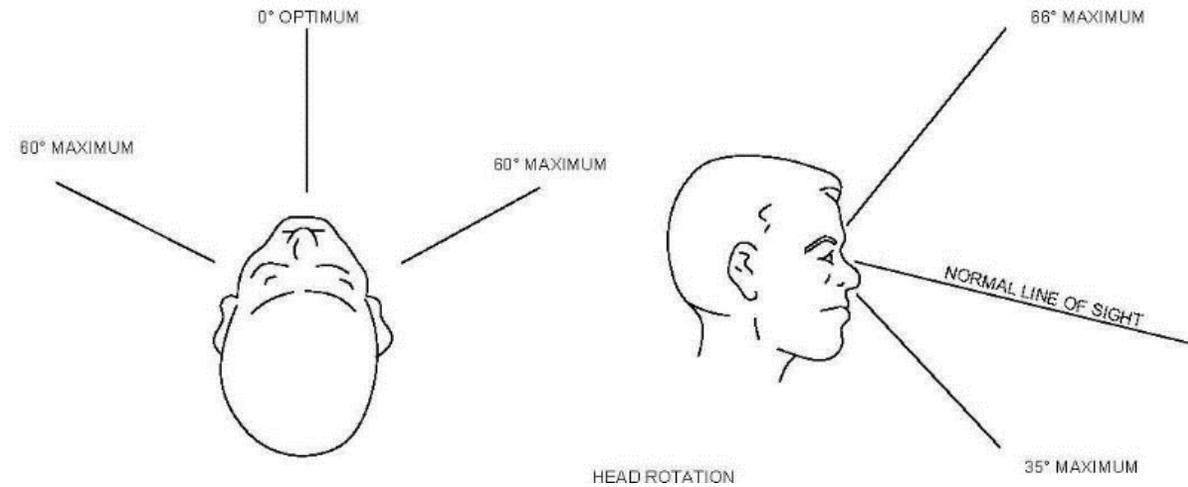
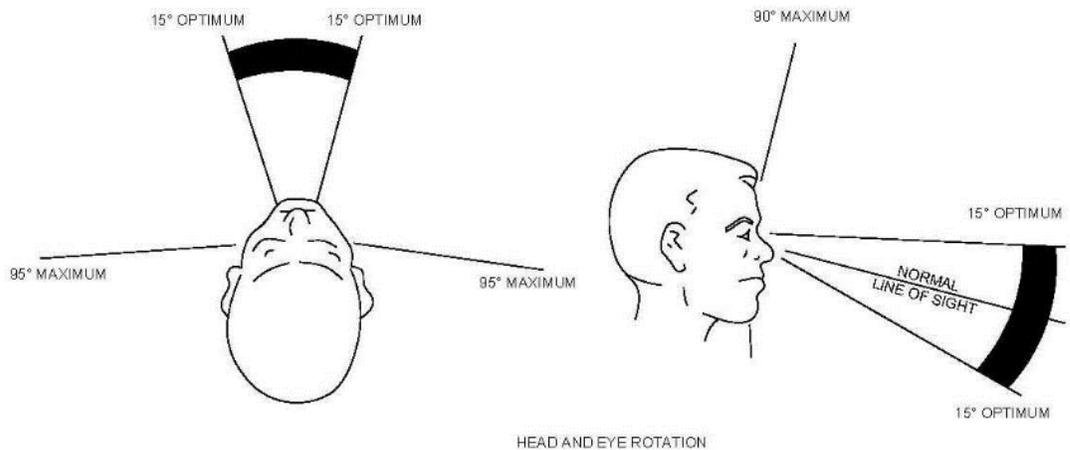
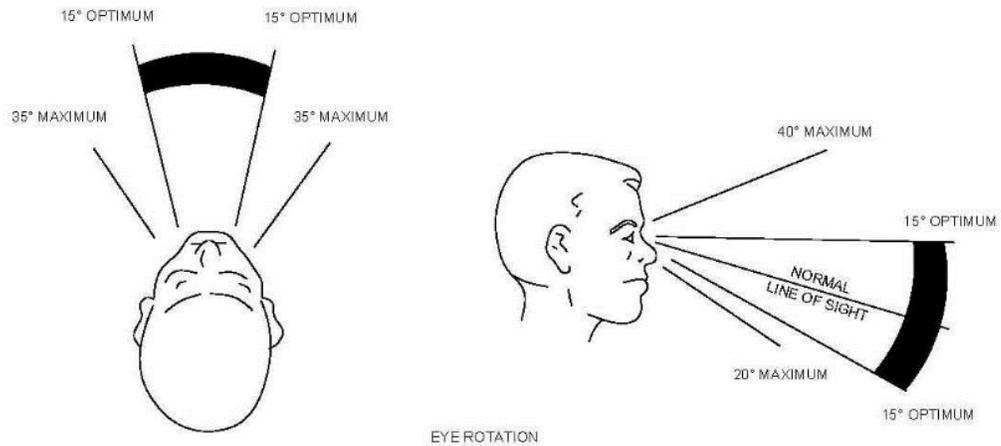
- 20"- 33.5"
- Shortest distance: least blurry, least irritated eyes, less headache, quicker vision recovery
- Longest distance: leaned forward

The Effects of Visual Display Distance on Eye Accommodation, Head Posture, and Vision and Neck Symptoms

David Rempel and Kirsten Willms, University of California, Berkeley, California, Jeffrey Anshel, Corporate Vision Consulting, Encinitas, California, Wolfgang Jaschinski, Leibniz Research Centre for Working Environment and Human Factors, Dortmund, Germany, and James Sheedy, College of Optometry, Pacific University, Forest Grove, Oregon

HUMAN FACTORS, Vol. 49, No. 5, October 2007, pp. 830-838

Monitor Position - Vertical and Horizontal Fields



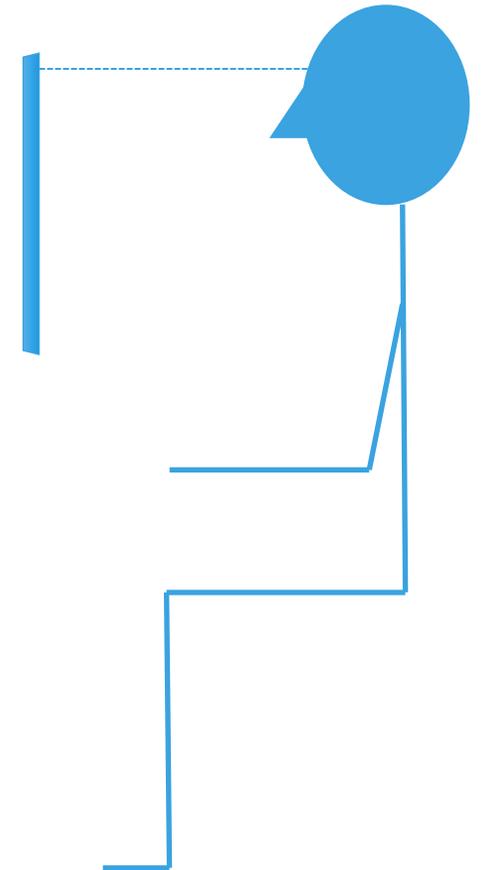
Existing Guidance

■ Posture

- Feet flat on floor
- Knees at 90 degrees
- Hips at 90 degrees (more open posture may be better)
- Elbows at 90 degrees
- Wrists neutral

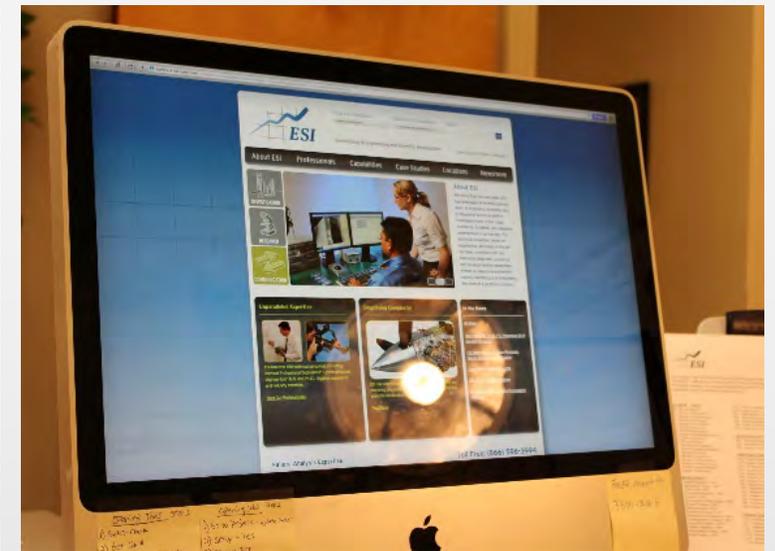
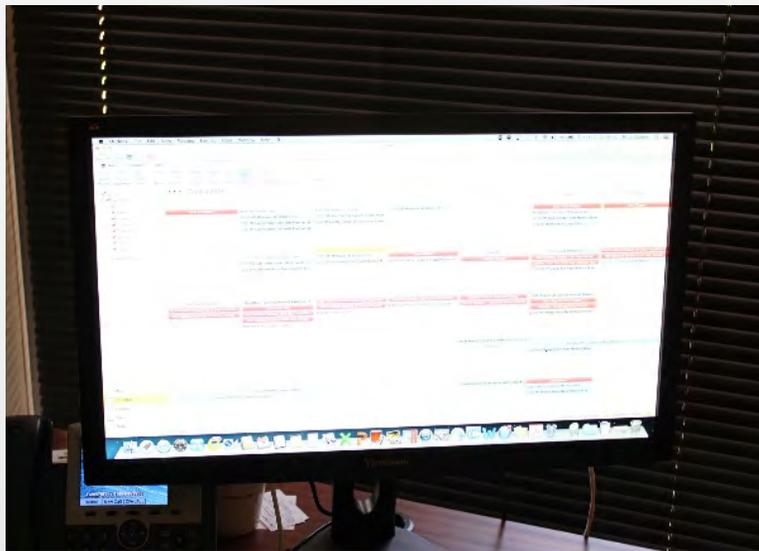
■ Monitor Position

- Top of screen ~ eye level
- Neutral or slight tilt back



Visual Function

Monitor Brightness/Glare



Existing Keyboard



Layout Nearly
150 Years Old!

First Prototype 1964

Nov. 17, 1970 D. C. ENGELBART 3,541,541
 X-Y POSITION INDICATOR FOR A DISPLAY SYSTEM
 Filed June 21, 1967 3 Sheets-Sheet 1

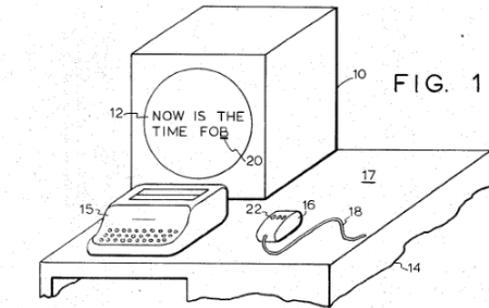


FIG. 1

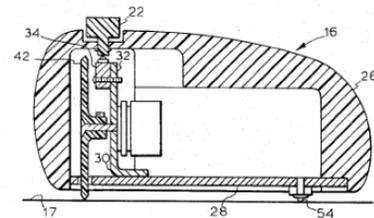


FIG. 2

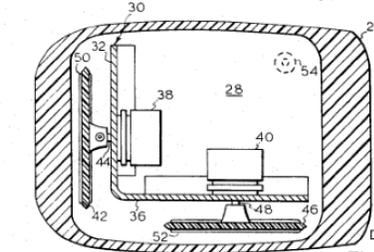


FIG. 3

INVENTOR
 DOUGLAS C. ENGELBART
 BY *Lindberg + Frickel*
 ATTORNEYS

Existing Mouse



Common Problems

Monitor Distance

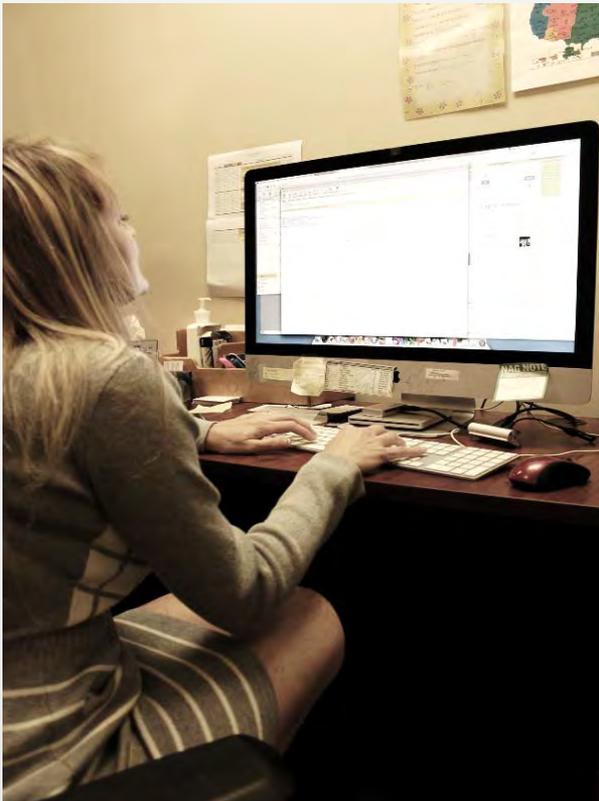


Monitor Size/Use of Glasses

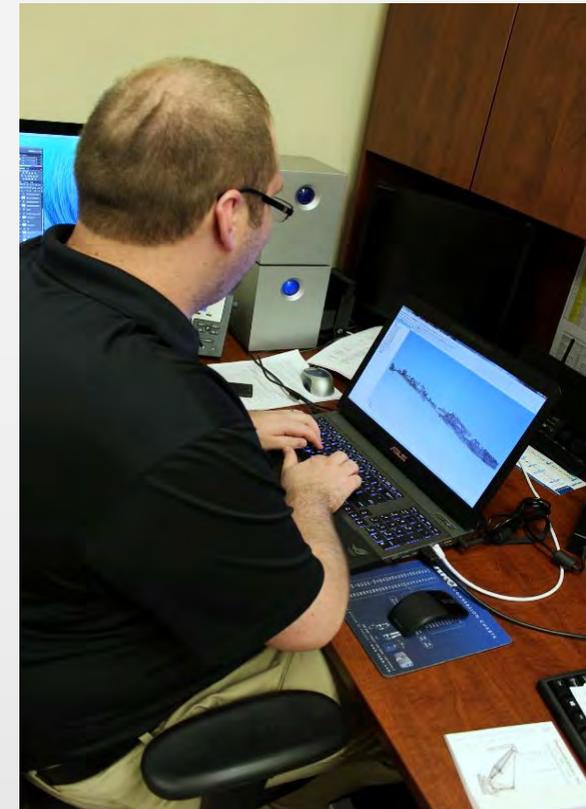


Common Problems

Chair Adjustment,
Not Using Wrist Rest

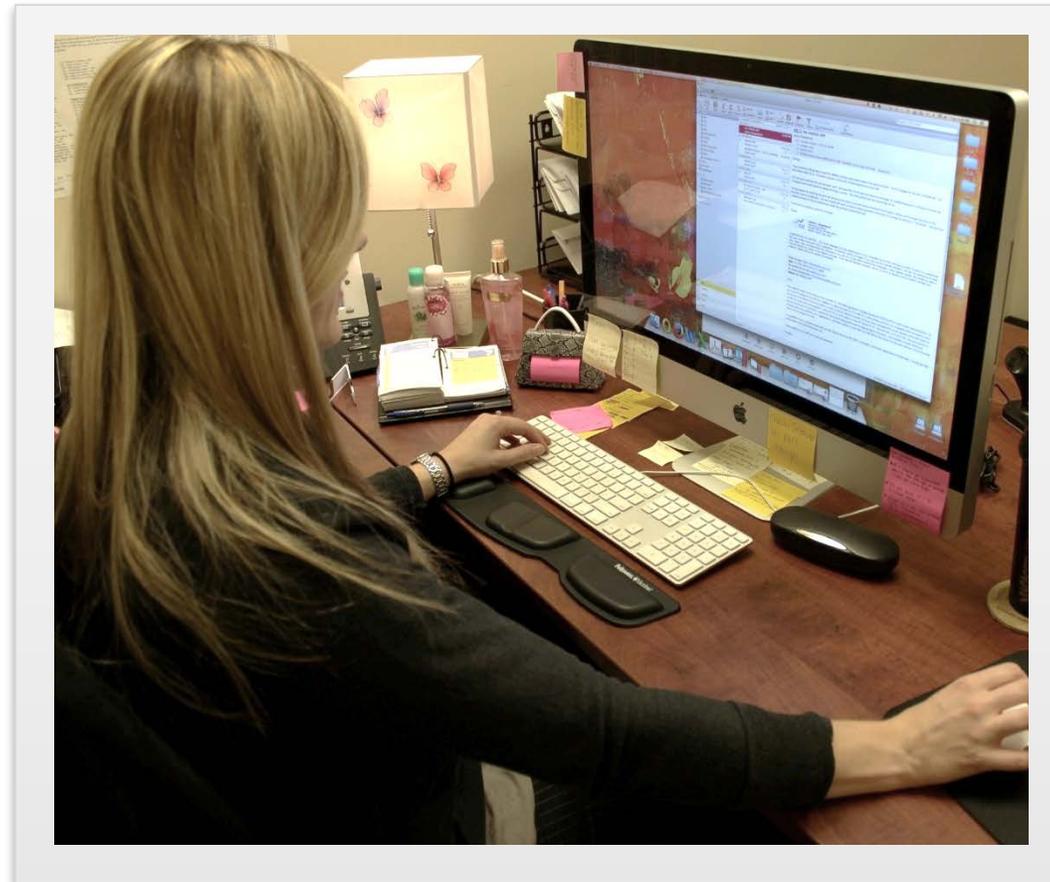


Task Chairs with Arms,
Laptops as Desktops



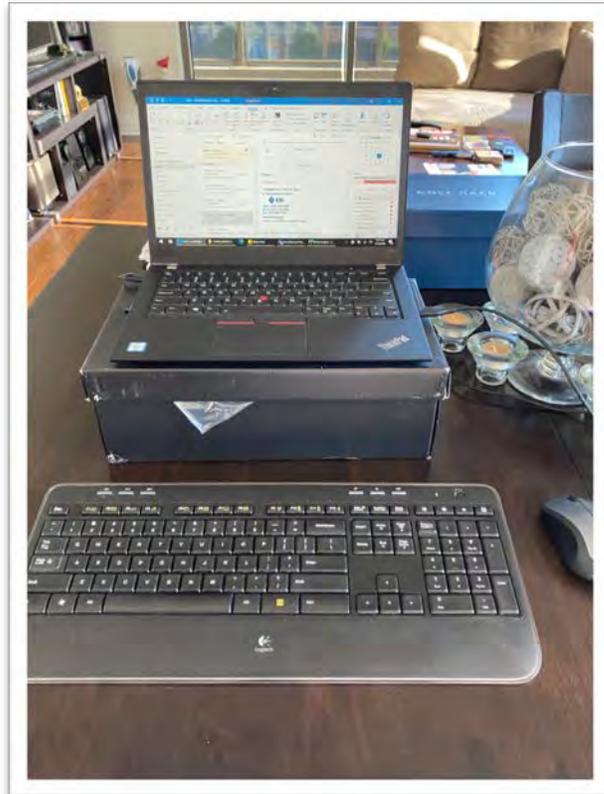
Common Problems

Mouse Use, Keyboard/Mouse Position



Common Home Office Problems

Monitor height/distance
No wrist rests



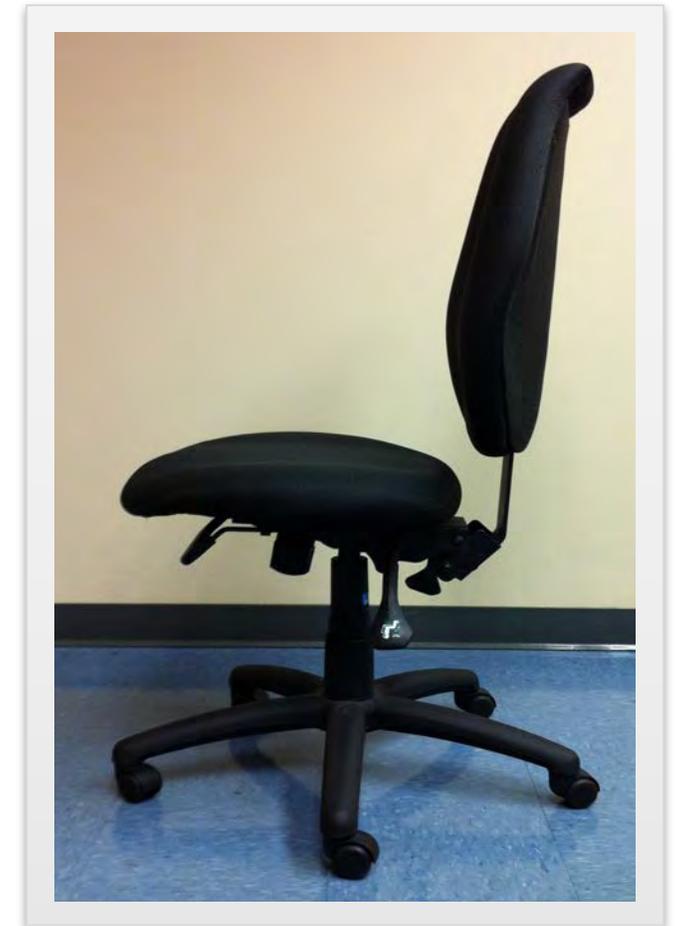
Cat eyeing your mouse



Recommendations

Qualities of Good Task Chair

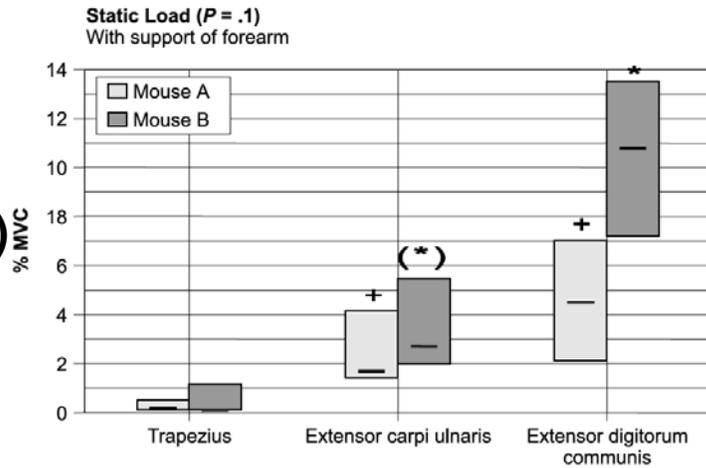
- Not \$\$\$
- Adjustability
 - Height
 - Seat back height
 - Seat pan depth
 - Seat back angle (nice extra)
- Waterfall front
- NO ARMS
- Kneeling chair if lower back pain problematic



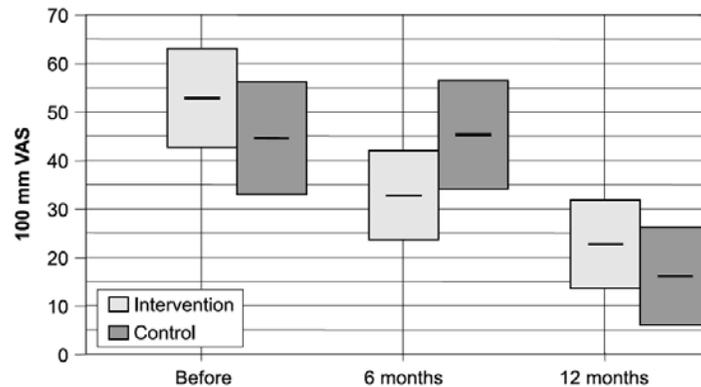
Recommendations

A Good Mouse

**EMG
(muscle activation)**



**Forearm
pain**



Recommendations

A Good Keyboard



Recommendations

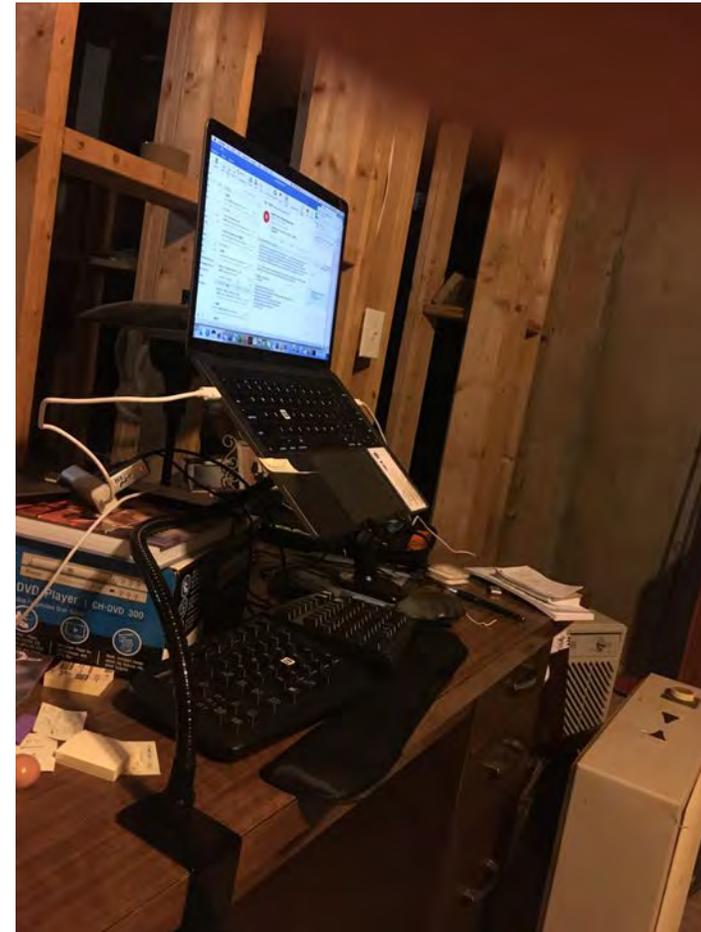
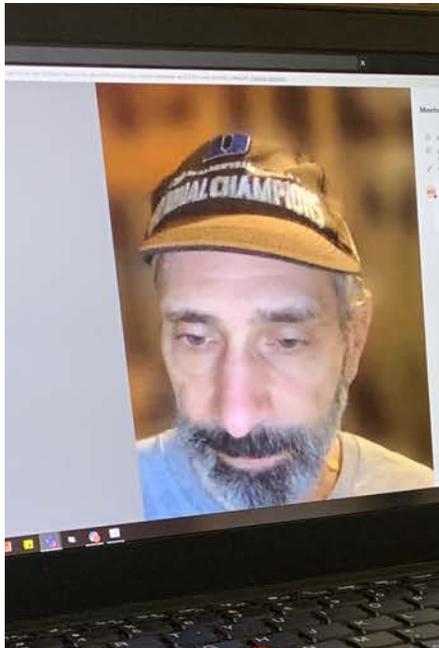
Additional tips and tricks for home offices

- Don't use laptop as keyboard AND monitor (ideally as neither)
- Top of screen at eye height (usually needs to raise up)
- Screen at typical reading distance (measure!), best without glasses
- Decent chair – may need to experiment to get good posture:
 - Ideally meets recommendations, but others may work
 - Consider stools, exercise balls, etc.
 - Adjust so that your arms are correctly positioned; consider foot rests if needed
- Wrist rests (gel usually best)
- Mouse close to keyboard

Recommendations

Additional tips and tricks for home offices

- Doesn't have to look pretty
- Neither do you (most of the time)

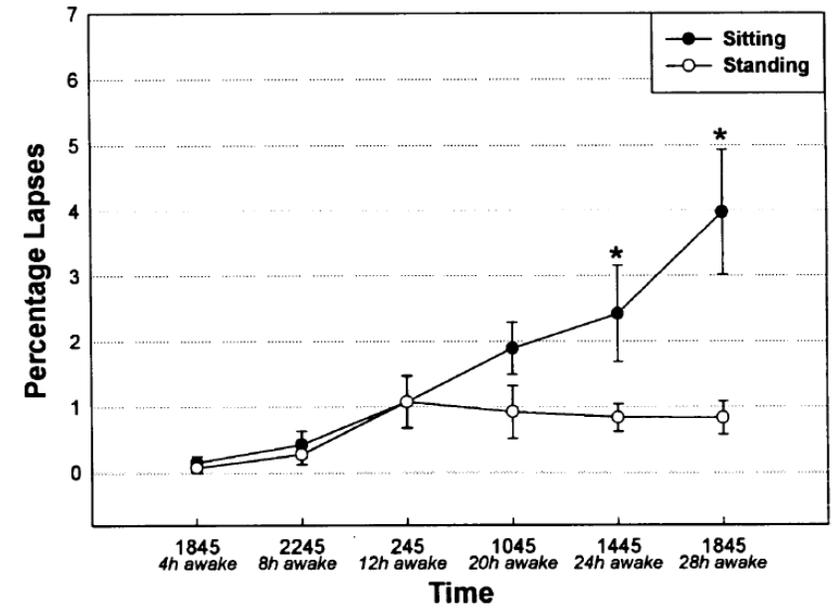
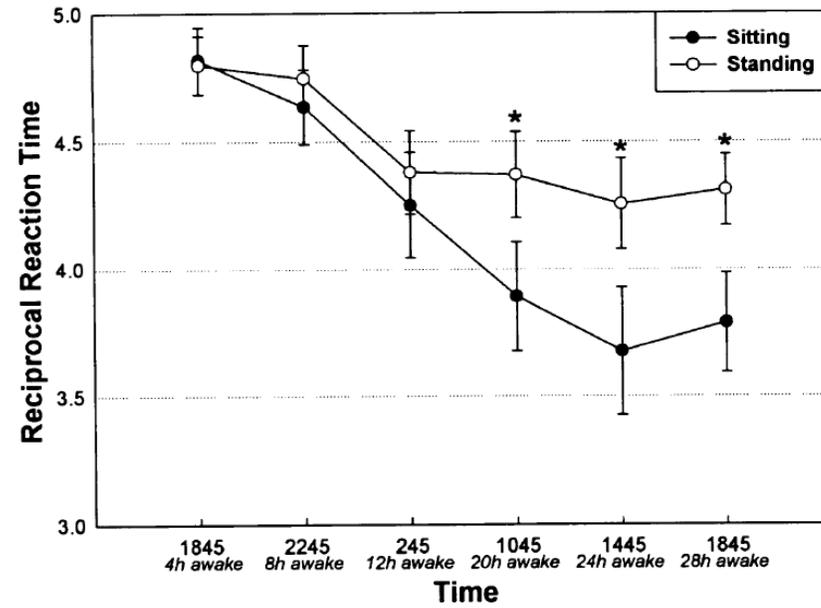


Recommendations

On the road (or avoiding kids)

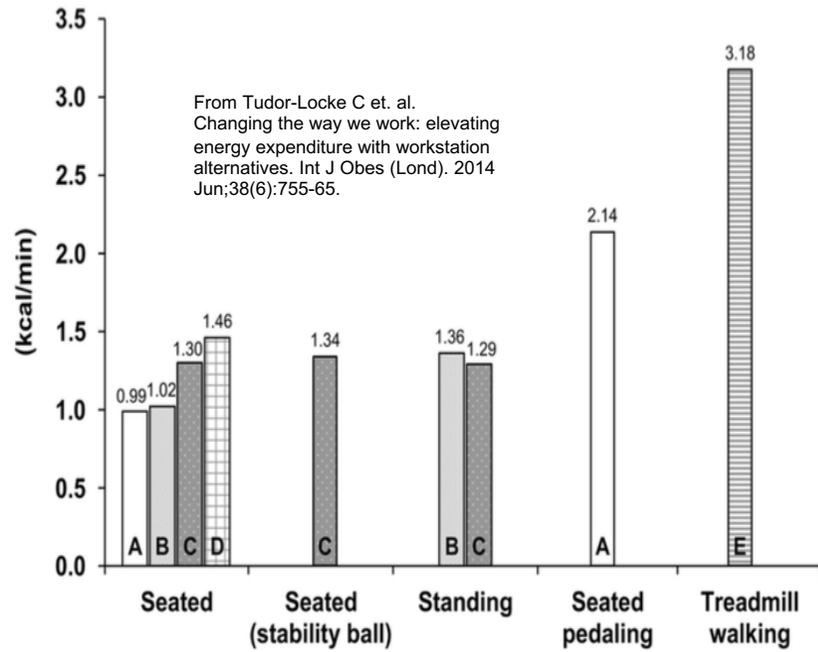


Standing



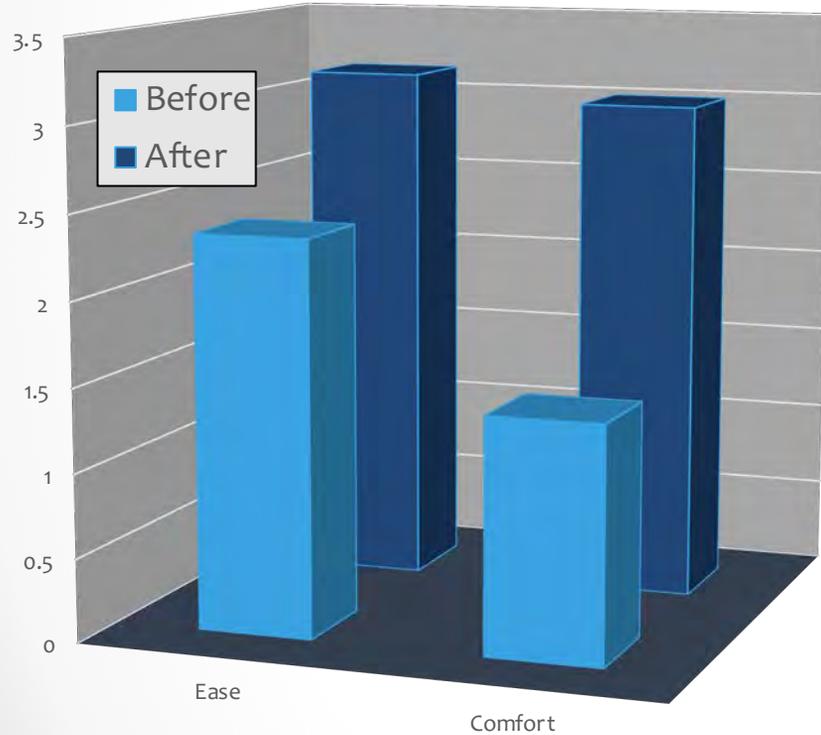
From Caldwell JA et. al. Body posture affects electroencephalographic activity and psychomotor vigilance task performance in sleep-deprived subjects. Clin Neurophysiol. 2003 Jan;114(1):23-31.

Standing



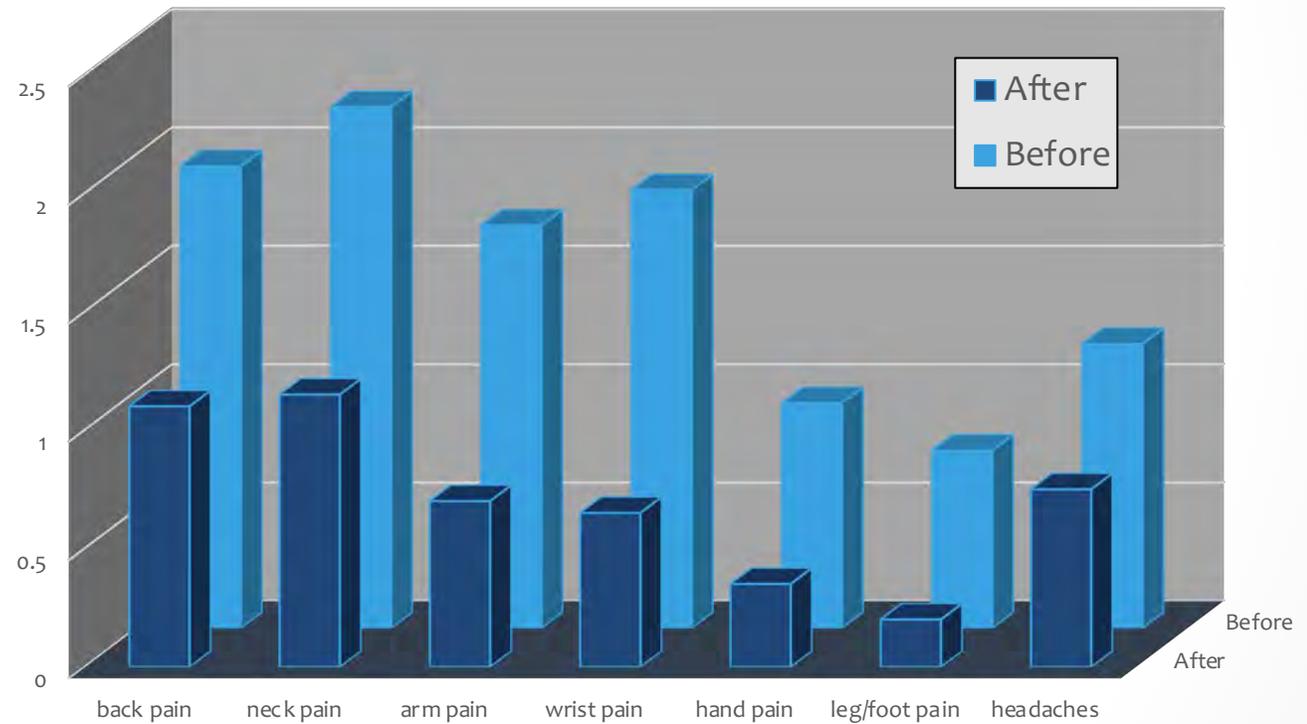
Ergonomic Intervention

Average Ease and Comfort Before and After an Ergonomic Intervention



n=71

Average Frequency (days per week) of Pain Before and After an Ergonomic Intervention



NOT an Office Ergonomics Program

Be Posture Perfect
UPRIGHT GO
Your Personal Posture
Trainer

**BUY NOW &
SAVE 30%**

**WATCH HOW
IT WORKS**



Discussion

